

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : 05-179535

(43)Date of publication of application : 20.07.1993

---

(51)Int.Cl.	D03D 15/00
	D01F 1/04
	D01F 6/92
	D01F 6/92
	D02G 3/04
	D02G 3/36

---

(21)Application number : 03-360485

(71)Applicant : UNITIKA LTD

(22)Date of filing : 26.12.1991

(72)Inventor : NAMIKAWA HIROSHI  
YAMAGAMI KIYOSHI

---

## (54) CONJUGATE YARN WOVEN FABRIC PREVENTING UV RAY

### (57)Abstract:

**PURPOSE:** To provide the UV ray-preventing conjugate yarn woven fabric excellent in the UV ray-preventing performance, having good water-absorbability and good in the skin touch and the hand touch by weaving specific composite spun yarns as warps and wefts.

**CONSTITUTION:** Conjugate spun yarns in which polyester or polyamide synthetic fiber multifilaments containing 1-3% of an inorganic pigment such as titanium oxide or zirconium oxide and having a D ray refractive index of  $\geq 2.0$  are used as the cores and in which cellulosic short fibers are used as the sheaths are formed. The conjugate spun yarns are woven as the warps and as the wefts to produce a woven fabric having a cover factor CF of  $\geq 20$ , the cover factor being satisfied with an equation:

$CF = Dw/Nw^{1/2} + Df/Nf^{1/2}$  wherein Dw is the density of the warp, Df is the density (warps/inch) of the warp, Nw is the cotton count of the warp and Nf is the cotton count of the weft.

---

## LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

Copyright (C); 1998,2003 Japan Patent Office

## \* NOTICES \*

JPO and NCIPi are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

CLAIMS

---

[Claim(s)]

[Claim 1] Ultraviolet-rays defense compound yarn textiles which the weight ratio of a sheath-core which arranged the synthetic-fiber multifilament in which a D line refractive index contains 2.0 or more inorganic pigments at 3% or less of a rate 1% or more to the heart, and arranged the cellulose system staple fiber on the sheath uses as circumstances yarn compound or more 0.5 spun yarn it is [ spun yarn ] 2.0 or less, and are characterized by the cover factor CF by several 1 being 20 or more.

[Equation 1]

$$\text{カバーファクタ} - CF = \frac{Dw}{\sqrt{Nw}} + \frac{Df}{\sqrt{Nf}}$$

It is here. CF: Cover factor Dw : Consistency of warp (inch/)

Df : consistency of the woof (inch/)

Nw : cotton yarn number Nf of warp : Cotton yarn number of the woof

---

[Translation done.]

**\* NOTICES \***

**JPO and NCIPi are not responsible for any damages caused by the use of this translation.**

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

**DETAILED DESCRIPTION**

---

[Detailed Description of the Invention]

[0001]

[Industrial Application] While defending the ultraviolet rays made harmful [ this invention ] to the body, the touch is good and is related with the textiles for garments which were rich in absorptivity.

[0002]

[Description of the Prior Art] the research which ultraviolet rays exert on the skin also prospers with the rise of protection and maintenance movement to the natural environment destruction see by destruction of the ozone layer of the atmospheric air which has intercept that a warming phenomenon and harmful ultraviolet rays reach to the earth in recent years , harmful reactions , such as the daylight karatosis by which ultraviolet rays are consider as a cause in clinical study , a pigment freckle , the angiotelectasis , and a wrinkle , are check , and these may become \*\*\*\* which develops into a malignant tumor -- until -- it is say .

[0003] Although it has been applied to the female cosmetics for summer and has been put in practical use since the ultraviolet ray absorbent etc. was examined about the defense to the skin of ultraviolet rays, p aminobenzoic acid, its derivative, benzoyl methane, etc. are well known by these ultraviolet ray absorbents. On the other hand, as application to the garments to ultraviolet-rays defense, the approach of fixing the above-mentioned ultraviolet ray absorbent for fiber with a binder is used well, and it is known that fibrin material will also be easily processible in the post-processing phase after \*\*\*\* and dyeing. Moreover, how to defend the skin is also learned by the ultraviolet-rays reflective dispersion agent for reflecting and scattering ultraviolet rays, and the thermoplastic synthetic fiber which scoured the inorganic pigment etc. is used also for garments.

[0004] However, there was a technical problem in these ultraviolet-rays defense garments, respectively, in the former, since degradation with the passage of time was carried out since sublimability is in the ultraviolet ray absorbent itself, or this absorbent was fixed with the binder, the limit was in wash-proof nature, and as garments for summer with many counts of wash, it was a problem.

[0005] Moreover, the thermoplastic synthetic-fiber garments which scoured the latter ultraviolet scattering agent Since this synthetic fiber is generally hydrophobic fiber, there is no absorptivity. Since the touch is also bad, As often written garments for summer, a technical problem comes out of sweat to feeling of wearing or the amenity. As opposed to the fiber passage section at the time of spinning of a manufacture process, and weaving (thread guide) furthermore, the inorganic pigment of a high degree of hardness which projected the inorganic pigments as an ultraviolet scattering agent on the fiber front face when a complement was scoured to ultraviolet-rays defense -- the ground -- Damage was remarkably done for the duty similar to sand paper sure enough, and technical problems -- quality and productivity may be checked -- occurred.

[0006]

[Problem(s) to be Solved by the Invention] This invention tends to offer the garments textiles which can defend harmful ultraviolet rays to the skin while maintaining the required absorptivity and the required touch as garments for summer, and aesthetic property.

[0007]

[Means for Solving the Problem] This invention solves these technical problems and has the next configuration. That is, the weight ratio of a sheath-core which arranged the synthetic-fiber multifilament in which a D line refractive index contains 2.0 or more inorganic pigments at 3% or less of a rate 1% or more to the heart, and arranged the cellulose system staple fiber on the sheath uses as circumstances yarn compound or more 0.5 spun yarn it is [ spun yarn ] 2.0 or less, and this invention makes a summary the ultraviolet-rays defense compound

yarn textiles characterized by the cover factor CF by several 2 being 20 or more.

[0008]

[Equation 2]

$$\text{カバーファクター} - CF = \frac{Dw}{\sqrt{Nw}} + \frac{Df}{\sqrt{Nf}}$$

[0009] It is here. CF: Cover factor Dw : Consistency of warp (inch/)

Df : consistency of the woof (inch/)

Nw : cotton yarn number Nf of warp : Cotton yarn number of the woof [0010] Hereafter, this invention is explained to a detail. The cellulose system staple fibers in this invention are regenerated fibers, such as hemp, such as cotton, linen, and a ramie, and viscose rayon, cuprammonium rayon, polynosic, etc., and it has suitable die length required to spin and a size.

[0011] In this invention, with the synthetic-fiber multifilament in which a D line refractive index contains 2.0 or more inorganic pigments at 3% or less of a rate 1% or more with a weight ratio Polyethylene terephthalate, By synthetic-fiber multifilament generally used for garments, such as nylon fiber multifilament, such as polyester fiber multifilament, such as polybutylene terephthalate, nylon 6, Nylon 12, and Nylon 66 What the D line refractive index made 2.0 or more inorganic pigments mix, made the content weight ratio 1 - 3%, and carried out silk manufacture in the polymer phase which is the manufacture process is said. A desirable D line refractive index is titanium oxide (D line refractive index 2.52) as 2.0 or more inorganic pigments. Zirconium dioxide (D line refractive index 2.20) It is mentioned.

[0012] A D line refractive index is a D line by the ATSUBE refractive-index meter. (an average of 589.3nm of helium bright lines) It is the measured value of a refractive index and correlates with the rate of it being scattered about and reflecting ultraviolet rays. The rate that a D line refractive index scatters about for them and reflects ultraviolet rays in 2.0 or less inorganic pigment is scarce, and when it is going to obtain the desired ultraviolet-rays defense engine performance, the content rate of the inorganic pigment of synthetic-fiber multifilament must be increased in the amount exceeding 3%, and it is not suitable for this invention. In order to carry out by making homogeneity distribute into this thermoplastic synthetic-fiber multifilament, as for an inorganic pigment, it is most effective to mix in the polymer phase in a production process.

[0013] Synthetic-fiber multifilament is made to contain an inorganic pigment at 3% or less of a rate 1% or more with a weight ratio. a content weight ratio -- less than 1% -- the defense nature of ultraviolet rays -- falling -- especially -- a long wave -- it becomes easy to penetrate ultraviolet rays (: [ A waves of ] 320-400nm).

Moreover, if it exceeds 3%, although ultraviolet-rays defense nature becomes good, to the thread guide of the spinning-and-weaving machine at the time of spinning and weaving, damage will be remarkably done for the duty of sand paper sure enough by friction, or the inorganic pigment of a high degree of hardness projected on the fiber front face will promote wear of the cutter at the time of the decision in sewing, and wear of a needle, and it will become the cause of checking quality and productivity.

[0014] well-known approach \*\*\*\* for which the compound spun yarn in this invention used ring spinning etc. - - while having the compound yarn structure of the sheath-core which things were made, arranged the synthetic-fiber multifilament containing an inorganic pigment to the heart, and arranged the cellulose system staple fiber on the sheath, the weight ratio of the sheath-core must be 2.0 or less [ 0.5 or more ].

[0015] It is because it may become debasement and the factor of productivity inhibition in proportion to the appearance surface area on the front face of yarn with the compound yarn structure of the side-by-side structure by the letter of interweaving and \*\*\*\* which a cellulose system staple fiber and both the fiber of synthetic-fiber multifilament distributed uniformly while a part of side face of the multifilament of the thermoplastic synthetic fiber containing this inorganic pigment reduces aesthetic property and absorptivity in order to surely appear on a yarn front face.

[0016] Moreover, although aesthetic property and absorptivity become very good when the weight ratio of a sheath-core does not fulfill 0.5 When ultraviolet-rays defense nature falls, the function as ultraviolet-rays defense garments is lost and the weight ratio of a sheath-core exceeds 2.0 Although ultraviolet-rays defense nature is good, while absorptivity and aesthetic property get extremely bad and stopping being suitable as garments for summer Yarn structure is because a part of multifilament of the thermoplastic synthetic fiber

which mixed this inorganic pigment surely appears on a yarn front face and it lifting-comes to be easy of said problem, since it changes from a sheath-core to the shape of \*\*\*\* closely.

[0017] The compound yarn textiles in this invention make it an indispensable condition for a cover factor CF to be 20 or more while using said compound spun yarn for circumstances yarn. Cover factor CF It is an index showing whenever [ covering / of the textiles by circumstances yarn ], It is calculated by the-three number.

[0018]

[Equation 3]

$$\text{カバーファクタ} - CF = \frac{Dw}{\sqrt{Nw}} + \frac{Df}{\sqrt{Nf}}$$

[0019] It is here. CF: Cover factor Dw : Consistency of warp (inch/)

Df : consistency of the woof (inch/)

Nw : cotton yarn number Nf of warp : Cotton yarn number of the woof [0020] Since the relation of the count and the textile consistency which constitute textiles becomes coarse when a cover factor does not fulfill 20, the opening between adjoining yarn will become large and the amount of ultraviolet rays penetrated through the fiber circles of this opening and ground will exceed a limit required for defense of the skin. The textiles which designed the cover factor practically so that it might become the range of 23-33 are desirable as garments for summer from points, such as the defense nature of ultraviolet rays, absorptivity, and a feeling of feeling of wearing. Even if yarn-dyeing processing and raw ground dyeing processing use together the so-called \*\*\*\* processing from which the approach that dyeing and finishing to the compound yarn textiles of this invention is well-known may be used, and the carbonization omission of the cellulose part are hydrolyzed and carried out according to an operation of after a print and an acid, it is spaced [ printing paste is made to contain strong acid etc., ] through a print part, and a shank is acquired, it can hardly change but ultraviolet-rays defense nature can also make aesthetics rich. While this invention defends ultraviolet rays, absorptivity and feeling-of-wearing nature obtain the compound yarn textiles in which it is good, and is quality and the stable production is possible by the above configuration.

[0021]

[Function] This invention uses as the heart synthetic-fiber multifilament which carried out suitable amount content of the inorganic pigment of the D line refractive index more than fixed, and uses a cellulose system staple fiber as a sheath. By passing through the compound spun yarn of the sheath-core structure which spun by the suitable mixed use weight ratio, arranging to the woof, and constituting textiles from a suitable consistency While the inorganic pigment mixed in the compound yarn core part scatters about for them and reflects ultraviolet rays to the emitted ultraviolet rays and defending the transparency With the cellulose system staple fiber of the compound yarn sheath which has covered the front face of these textiles, the textiles for garments which raised garments properties, such as absorptivity, aesthetic property, and the touch, can be obtained.

[0022]

[Example] Next, an example explains this invention concretely. The zirconium dioxide whose D line refractive index is 2.20 is mixed in a polymer phase. A content weight ratio 75 denier 36 filaments of polyester multifilament which are four kinds which are 0.5%, 1.0%, 2.0%, and 3.5%, A D line refractive index is the zeolite of 1.48. 75 denier 36 filaments of polyester multifilament contained 3.5%, Zirconium dioxide 40-denier 24 filaments contained 2.0%, 50-denier 24 filaments, and 100 Spinning of a total of eight kinds of polyester multifilament of denier 36 filament was carried out.

[0023] Next, eight sorts of No. 40 count compound spun yarn which allots combed cotton slubbing created at the usual \*\*\*\* process to a sheath, allots eight kinds of aforementioned polyester filaments to the heart, and has sheath-core structure at the fine-spinning process in ring spinning and combed cotton slubbing, and a zirconium dioxide One sort of No. 40 count (cotton yarn number) compound spun yarn which allotted 75-denier 36 filaments contained 2.0% to side by side was obtained. The configuration (the class of synthetic-fiber multifilament content inorganic pigment, a content, a denier and the yarn structure of compound yarn, the heart / sheath ratio) of nine sorts (compound yarn No. I - Li) of obtained No. 40 compound spun yarn is shown in Table 1.

[0024]

[Table 1]

複合糸No	無機顔料		合成繊維 デニール	糸構造	芯／鞘比率
	種類	含有量			
イ	酸化シリコン	0.5%	75d	芯／鞘	55/45=1.22
ロ	酸化シリコン	1.0%	75d	芯／鞘	55/45=1.22
ハ	酸化シリコン	2.0%	75d	芯／鞘	55/45=1.22
ニ	酸化シリコン	2.0%	75d	サイドバイサイド	55/45=1.22
ホ	酸化シリコン	2.0%	100d	芯／鞘	80/20=4.00
ヘ	酸化シリコン	2.0%	50d	芯／鞘	35/65=0.54
ト	酸化シリコン	2.0%	40d	芯／鞘	30/70=0.43
チ	酸化シリコン	3.5%	75d	芯／鞘	55/45=1.22
リ	ゼオライト	3.5%	75d	芯／鞘	55/45=1.22

[0025] While using nine kinds of each obtained compound spun yarn for circumstances yarn and carrying out weaving of the plain weave fabric (textile No.A-I) of 125 warp consistencies/inch and 70 woof consistencies/inch Compound yarn No. Ha is used for circumstances yarn. The textiles (textile No.J) and 64 warp consistencies/inch of 82 warp consistencies [/inch ] and woof consistency 64 / <FONT SIZE=-2> inch, Weaving of the textiles (textile No.K) of 50 woof consistencies/inch was carried out, refinement bleaching of a total of 11 kinds of textiles was carried out with the conventional method, and 11 kinds of \*\*\*\*\* obtained \*\*\*\*\*.

[0026] 11 kinds of obtained \*\*\*\*\* -- the finish consistency of \*\*\*\*\* , and finish -- the result of having evaluated the thread guide wear used as the factor which checks the quality mentioned above and productivity in a manufacture process until it reaches [ from the yarn of each compound yarn ] the ground is collectively shown in Table 2 with the cover factor of the ground and ultraviolet-rays permeability, absorptivity, and the evaluation result of aesthetic property.

[0027]

[Table 2]

織物No.	使用糸	仕上密度		仕上生地 が-アタ-	紫外線透過率		吸水性		風合 評価	糸道摩耗 評価
		経	緯		A波長	評価	バレル	評価		
A (比較例)	イ	131	74	32.4	28%	×	52mm	○	○	○
B (本発明)	ロ	131	74	32.4	14	○	56	○	○	○
C (本発明)	ハ	131	74	32.4	11	○	54	○	○	○
D (比較例)	ニ	131	74	32.4	10	○	54	○	△	△
E (比較例)	ホ	131	74	32.4	8	○	23	×	×	×
F (本発明)	ヘ	131	74	32.4	14	○	71	○	○	○
G (比較例)	ト	131	74	32.4	25	×	86	○	○	○
H (比較例)	チ	131	74	32.4	9	○	55	○	○	△
I (比較例)	リ	131	74	32.4	37	×	56	○	○	△
J (本発明)	ハ	86	67	24.2	14	○	52	○	○	○
K (比較例)	ハ	67	53	19.0	26	×	53	○	○	○

[0028] - The evaluation approach and ultraviolet-rays permeability They are a display and absorptivity at a percentage about the ratio of the luminous intensity by the spectrophotometer in case there is nothing with the time of there being a sample of A waves (400-320nm) of ultraviolet rays. --- JIS L 1096 (BAIRETSUKUSU law) Semi- \*\* and aesthetic property --- Handling evaluation with the pair comparison method by the inspector [0029] Each evaluation in Table 2 is set to ultraviolet-rays permeability evaluation. A waves of ultraviolet rays supposed that it is hard to cause an ultraviolet-rays problem practically set [ at the thing of less than 15% of ultraviolet-rays permeability ] x mark to water absorption evaluation again O mark and the thing beyond it. x mark is set [ at a thing 50m //m / or more ] to aesthetic property evaluation in law O mark and the other thing. Bayh Lec which does sweat absorption that there is no displeasure at the time of sweating -- With the pair comparison method, it set to O mark and a little bad thing at the good thing, x mark was set to thread guide wear evaluation at \*\* and a bad thing, and x mark showed to what may cause O and trouble to what has trouble neither in quality nor production at the thing \*\* and improving.

[0030] When \*\*\*\*\*No.B, and C, F and J excelled [ \*\*\*\*\* / by this invention ] in the defense engine performance of ultraviolet rays, absorptivity and the touch were also good to \*\* and very excellent in the garments property as garments for summer synthetically at it. [ like / it is \*\*\*\*\* from Table 2 and ] On the other hand, textile No.A with few contents of an inorganic pigment The defense engine performance of ultraviolet rays is inferior. Textile No.H with many contents of an inorganic pigment Thread guide wear starts at the process to textile manufacture, and textile No.D whose yarn structure of compound spun yarn is not sheath-core structure but side-by-side structure A difficulty is in aesthetic property and thread guide wear. Textile No.E with the large ratio of the heart of compound spun yarn Absorptivity worsens and aesthetic property and thread guide wear also worsen. Textile No.G with the small ratio of the heart of compound spun yarn, Small textile No.K of a cover factor and textile No.I which used the synthetic-fiber multifilament containing a zeolite with a small D line refractive index for the heart of compound yarn were those in which the defense engine performance of ultraviolet rays is inferior.

[0031]

[Effect of the Invention] Its versatility is high as a garments application which is not looked at by the former in which absorptivity and the touch are good and the production in which it was stabilized with sufficient quality

is possible while the compound yarn textiles of this invention are excellent in the defense engine performance of ultraviolet rays.

---

[Translation done.]



**CONJUGATE YARN WOVEN FABRIC PREVENTING UV RAY**

**Patent number:** JP5179535  
**Publication date:** 1993-07-20  
**Inventor:** NAMIKAWA HIROSHI; YAMAGAMI KIYOSHI  
**Applicant:** UNITIKA LTD  
**Classification:**  
- international: D01F1/04; D01F6/92; D02G3/04; D02G3/36; D03D15/00  
- european:  
**Application number:** JP19910360485 19911226  
**Priority number(s):** JP19910360485 19911226

Report a data error here

**Abstract of JP5179535**

**PURPOSE:** To provide the UV ray-preventing conjugate yarn woven fabric excellent in the UV ray-preventing performance, having good water-absorbability and good in the skin touch and the hand touch by weaving specific composite spun yarns as warps and wefts. **CONSTITUTION:** Conjugate spun yarns in which polyester or polyamide synthetic fiber multifilaments containing 1-3% of an inorganic pigment such as titanium oxide or zirconium oxide and having a D ray refractive index of  $\geq 2.0$  are used as the cores and in which cellulosic short fibers are used as the sheaths are formed. The conjugate spun yarns are woven as the warps and as the wefts to produce a woven fabric having a cover factor CF of  $\geq 20$ , the cover factor being satisfied with an equation:  $CF = Dw/Nw < 1/2 > + Df/Nf < 1/2 >$  wherein Dw is the density of the warp, Df is the density (warps/inch) of the warp, Nw is the cotton count of the warp and Nf is the cotton count of the weft.

---

Data supplied from the esp@cenet database - Worldwide

(19) 日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11) 特許出願公開番号

特開平5-179535

(43) 公開日 平成5年(1993)7月20日

(51) Int.Cl. <sup>5</sup>	識別記号	庁内整理番号	F I	技術表示箇所
D 0 3 D 15/00	E	7199-3B		
D 0 1 F 1/04		7199-3B		
6/92	3 0 1 M	7199-3B		
	Q	7199-3B		
	3 0 3 B	7199-3B		

審査請求 未請求 請求項の数1(全 5 頁) 最終頁に続く

(21) 出願番号 特願平3-360485

(22) 出願日 平成3年(1991)12月26日

(71) 出願人 000004503

ユニチカ株式会社

兵庫県尼崎市東本町1丁目50番地

(72) 発明者 並川 博

尼崎市東園田町6丁目46番地

(72) 発明者 山上 清

尼崎市東園田町6丁目46番地

(54) 【発明の名称】 紫外線防御複合系織物

(57) 【要約】

【構成】 D線屈折率が2.0以上の酸化ジルコニウム等の無機顔料を1~3%含有するポリエステルフィラメントを芯に、セルロース系繊維を鞘に配し、複合比を0.5~2とした複合紡績糸を経緯糸に用い、経緯のカバークラフトの和を20以上とした複合系織物。

【効果】 無機顔料が紫外線を散乱、反射して、織物を透過することを防御するとともに、織物の表面を覆っているセルロース繊維により、吸湿性、風合い、肌触り等の衣料特性を向上できる。

1

## 【特許請求の範囲】

【請求項1】 D線屈折率が2.0以上の無機顔料を1%以上3%以下の割合で含有する合成繊維マルチフィラメントを芯に、セルロース系短繊維を鞘に配した、芯鞘の\*

$$\text{カバーファクターCF} = \frac{Dw}{\sqrt{Nw}} + \frac{Df}{\sqrt{Nf}}$$

ここで、CF：カバーファクター

Dw：経糸の密度（本／インチ）

Df：緯糸の密度（本／インチ）

Nw：経糸の綿番手

Nf：緯糸の綿番手

## 【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、人体に有害とされる紫外線を防御すると共に、肌触りが良く、吸水性に富んだ衣料用繊維に関するものである。

【0002】

【従来の技術】近年、温暖化現象や有害紫外線が地球へ到達するのを遮断してきた大気層のオゾン層の損壊にみられる自然環境破壊に対する保護、保全運動の高まりとともに、紫外線が皮膚に及ぼす研究も盛んとなり、臨床学的に紫外線が原因とされる、日光角化症や色素斑、毛細血管拡張、皸等の有害な反応が確認され、これらは悪性腫瘍へと発展する母地になる可能性があるとまでいわれている。

【0003】紫外線の皮膚に対する防御に関しては、紫外線吸収剤等が検討されて以来、夏用の女性化粧品に採用されて実用化されているが、これらの紫外線吸収剤には、パラアミノ安息香酸やその誘導体やベンゾイルメタン等が良く知られている。一方、紫外線防御に対する衣料への応用としては、前述の紫外線吸収剤をバインダーで繊維に固着する方法がよく用いられており、繊維素材を選ばず、染色後の後加工段階で簡単に加工できることも知られている。また、紫外線を反射、散乱させる為の紫外線反射散乱剤によって皮膚を防御する方法も知られており、無機顔料等を練り込んだ熱可塑性合成繊維等が衣料にも利用されている。

【0004】しかしながら、これらの紫外線防御衣料に※

2

\*重量比が0.5以上2.0以下である複合紡績糸を経緯糸とし、数1によるカバーファクターCFが20以上であることを特徴とする紫外線防御複合糸織物。

【数1】

10※は、それぞれ課題があり、前者においては、紫外線吸収剤そのものに昇華性がある為に経時劣化したり、バインダーで該吸収剤を固着している為に耐洗濯性に限度があり、洗濯回数の多い夏用衣料としては問題であった。

【0005】また後者の紫外線散乱剤を練り込んだ熱可塑性合成繊維衣料は、一般に該合成繊維が疎水性繊維であるために吸水性がなく、肌触りも悪い為、汗をよくかく夏用衣料としては着心地や快適性に課題が出てしまい、更に、紫外線散乱剤としての無機顔料類を紫外線防御に必要な量を練り込んだ場合、繊維表面に突出した高硬度の無機顔料が、生地製造過程の紡績時や製織時の繊維通過部（糸道）に対して、紙ヤスリに似た役目を果たして著しく損傷を与え、品質や生産性を阻害してしまう場合がある等の課題があった。

【0006】

【発明が解決しようとする課題】本発明は、夏用衣料としての必要な吸水性や肌触りや風合いを維持するとともに、皮膚に対して有害な紫外線を防御しうる衣料織物を提供しようとするものである。

【0007】

【課題を解決するための手段】本発明は、これらの課題を解決するもので、次の構成をもつものである。すなわち、本発明は、D線屈折率が2.0以上の無機顔料を1%以上3%以下の割合で含有する合成繊維マルチフィラメントを芯に、セルロース系短繊維を鞘に配した、芯鞘の重量比が0.5以上2.0以下である複合紡績糸を経緯糸とし、数2によるカバーファクターCFが20以上であることを特徴とする紫外線防御複合糸織物を要旨とするものである。

【0008】

【数2】

$$\text{カバーファクターCF} = \frac{Dw}{\sqrt{Nw}} + \frac{Df}{\sqrt{Nf}}$$

【0009】ここで、CF：カバーファクター

Dw：経糸の密度（本／インチ）

Df：緯糸の密度（本／インチ）

Nw：経糸の綿番手

Nf：緯糸の綿番手

【0010】以下、本発明を詳細に説明する。本発明に於けるセルロース系短繊維とは、綿や、リネンやラミー等の麻や、ビスコースレーヨン、銅アンモニアレーヨン、ポリノジック等の再生繊維等であり、紡績するに必要な適当な長さ、太さを有するものである。

【0011】本発明において、D線屈折率が2.0以上の無機顔料を重量比率で1%以上3%以下の割合で含有する合成繊維マルチフィラメントとは、ポリエチレンテレフタレート、ポリブチレンテレフタレート等のポリエステル系繊維マルチフィラメントやナイロン6、ナイロン12、ナイロン66等のナイロン繊維マルチフィラメント等一般に衣料用に用いられる合成繊維マルチフィラメントで、その製造過程であるポリマー段階で、D線屈折率が2.0以上の無機顔料を混入させ、その含有重量比率を1~3%として、製糸したものをいう。好ましいD線屈折率が2.0以上の無機顔料としては、酸化チタン（D線屈折率2.52）や酸化ジルコニウム（D線屈折率2.20）が挙げられる。

【0012】D線屈折率は、アツベ屈折率計によるD線（ヘリウム輝線平均589.3nm）の屈折率の測定値であり、紫外線を散乱、反射させる割合と相関する。D線屈折率が2.0以下の無機顔料では、紫外線を散乱、反射する割合が乏しく、所望の紫外線防御性能を得ようとした場合、合成繊維マルチフィラメントの無機顔料の含有割合を3%を越える量に増やさねばならず、本発明には適さない。該熱可塑性合成繊維マルチフィラメント内に均一に分散配置させさせるには、無機顔料は製造工程中のポリマー段階で混入するのがもっとも効果的である。

【0013】無機顔料は、合成繊維マルチフィラメントに重量比率で1%以上3%以下の割合で含有させる。含有重量比率が1%未満では、紫外線の防御性が低下し、特に長波紫外線（A波長：320~400nm）が透過しやすくなる。また、3%を超えると、紫外線防御性は良くなるが、繊維表面に突出した高硬度の無機顔料が、紡績時や製織時の紡織機の糸道に対して、摩擦によって紙ヤスリの役目を果たして著しく損傷を与えたり、縫製における裁断時のカッターの摩耗やミシン針の摩耗を促進させ、\*

$$\text{カバーファクターCF} = \frac{Dw}{\sqrt{Nw}} + \frac{Df}{\sqrt{Nf}}$$

【0019】ここで、CF：カバーファクター

Dw：経糸の密度（本／インチ）

Df：緯糸の密度（本／インチ）

Nw：経糸の綿番手

Nf：緯糸の綿番手

【0020】カバーファクターが20に満たない場合は、織物を構成している糸番手と織物密度との関係が粗くなってしまいうために、隣接している糸間の空隙が大きくなり、この空隙や生地繊維部内を経て透過する紫外線量が、皮膚の防御に必要な限度を越えてしまう。実用上はカバーファクターを23~33の範囲になるように設計した織物が、紫外線の防御性、吸水性、着心地感等の点から夏用衣料として好ましい。本発明の複合糸織物に対する染色加工は、糸染加工や生地染加工とも公知の方法で良く、また、強酸等を捺染糊に含有させて印捺後、酸の作

\*品質や生産性を阻害する原因となる。

【0014】本発明における複合紡績糸は、リング紡績等を利用した公知の方法得ることができ、無機顔料を含有した合成繊維マルチフィラメントを芯に、セルロース系短繊維を鞘に、配した芯鞘の複合糸構造をもつものであると共に、その芯鞘の重量比率は、0.5以上2.0以下でなければならない。

【0015】セルロース系短繊維と合成繊維マルチフィラメントの両繊維が均一に分散した混織状や交捻によるサイドバイサイド構造の複合糸構造では、該無機顔料を含有した熱可塑性合成繊維のマルチフィラメントの側面の一部が、必ず糸表面に現出するために風合いや吸水性を低下させるとともに、糸表面の現出表面積に比例して、品質低下や生産性阻害の要因となる可能性があるからである。

【0016】また、芯鞘の重量比率が0.5に満たない場合には、風合いや吸水性は大変良くなるが、紫外線防御性が低下して紫外線防御衣料としての機能を失ってしまい、芯鞘の重量比率が2.0を越える場合には、紫外線防御性は良いが吸水性や風合いは極端に悪くなり、夏用衣料として適さなくなるとともに、糸構造が芯鞘から交捻状に近く成ってしまう為、該無機顔料を混入した熱可塑性合成繊維のマルチフィラメントの一部が必ず糸表面に現出してしまい、前記問題を起こし易くなるからである。

【0017】本発明における複合糸織物は、前記複合紡績糸を経緯糸に用いると共に、カバーファクターCFが20以上であることを必須条件とするものである。カバーファクターCFは、経緯糸による織物の被覆度を表す指標であり、数3により計算される。

【0018】

【数3】

用によってセルロース部分を加水分解、炭化脱落させて印捺部分に透かし柄を得る、いわゆる、抜食加工とを併用しても紫外線防御性はほとんど変わらず、審美性を富ませることもできる。本発明は、紫外線を防御するとともに、吸水性、着心地性が良く、且つ、品質が良く、安定した生産が可能な複合糸織物を以上の構成によって得るものである。

【0021】

【作用】本発明は、一定以上のD線屈折率の無機顔料を適切な量含有した合成繊維マルチフィラメントを芯に、セルロース系短繊維を鞘にして、適切な混用重量比で紡績した芯鞘構造の複合紡績糸を経、緯糸に配置し、適切な密度で織物を構成することによって、放射された紫外線に対して、複合糸芯部に混入した無機顔料が紫外線を散乱、反射してその透過を防御するとともに、該織物の表

面を覆っている複合糸鞘部のセルロース系短繊維によって、吸水性や風合いや肌触り等の衣料特性を向上させた衣料用織物を得ることができる。

#### 【0022】

【実施例】次に実施例によって本発明を具体的に説明する。D線屈折率が2.20である酸化ジルコニウムをポリマー段階で混入し、含有重量比率が0.5%、1.0%、2.0%、3.5%の4種類のポリエステルマルチフィラメント75デニール36フィラメント、D線屈折率が1.48のゼオライトを3.5%含有したポリエステルマルチフィラメント75デニール36フィラメント、酸化ジルコニウムを2.0%含有した40デニール24フィラメント、50デニール24フィラメント、100デニール36フィラメントの合計8種類の\*

\*ポリエステルマルチフィラメントを紡糸した。

【0023】次に通常の綿紡工程で作成したコーマ綿粗糸を鞘に、前記の8種類のポリエステルフィラメントを芯に配して、リング紡績における精紡工程にて、芯鞘構造をもつ8種の40番手の複合紡績糸、及びコーマ綿粗糸と酸化ジルコニウムを2.0%含有した75デニール36フィラメントとをサイドバイサイドに配した1種の40番手（綿番手）の複合紡績糸を得た。得られた9種（複合糸No. イ〜リ）の40番手複合紡績糸の構成（合成繊維マルチフィラメント含有無機顔料の種類、含有量、デニール、及び複合糸の糸構造、芯／鞘比率）を表1に示す。

#### 【0024】

【表1】

複合糸No.	無機顔料		合成繊維 デニール	糸構造	芯／鞘比率
	種類	含有量			
イ	酸化ジルコニウム	0.5%	75d	芯／鞘	55/45=1.22
ロ	酸化ジルコニウム	1.0%	75d	芯／鞘	55/45=1.22
ハ	酸化ジルコニウム	2.0%	75d	芯／鞘	55/45=1.22
ニ	酸化ジルコニウム	2.0%	75d	サイドバイサイド	55/45=1.22
ホ	酸化ジルコニウム	2.0%	100d	芯／鞘	80/20=4.00
ヘ	酸化ジルコニウム	2.0%	50d	芯／鞘	35/65=0.54
ト	酸化ジルコニウム	2.0%	40d	芯／鞘	30/70=0.43
チ	酸化ジルコニウム	3.5%	75d	芯／鞘	55/45=1.22
リ	ゼオライト	3.5%	75d	芯／鞘	55/45=1.22

【0025】得られた9種類の複合紡績糸それぞれを経緯糸に用いて、経糸密度125本／インチ、緯糸密度70本／インチの平織物（織物No. A〜I）を製織するとともに、複合糸No. ハを経緯糸に用いて、経糸密度82本／インチ、緯糸密度64本／インチの織物（織物No. J）および経糸密度64本／インチ、緯糸密度50本／インチの織物（織物No. K）を製織し、合計11種類の織物を常法にて精練漂白して、11種類の加工揚げり生地を得た。

【0026】得られた11種類の加工揚げり生地の仕上密度、仕上生地のカバーファクターおよび紫外線透過率、吸水性、風合いの評価結果とともに、それぞれの複合糸の糸から生地に至るまでの製造過程に於いての前述した品質や生産性を阻害する要因となる糸道摩耗を評価した結果を表2に併せて示す。

#### 【0027】

【表2】

織物No.	使用糸	仕上密度		仕上生地 ガーファク	紫外線透過率		吸水性		風合 評価	糸道摩耗 評価
		経	緯		A波長	評価	バレル	評価		
A (比較例)	イ	131	74	32.4	28%	×	52mm	○	○	○
B (本発明)	ロ	131	74	32.4	14	○	56	○	○	○
C (本発明)	ハ	131	74	32.4	11	○	54	○	○	○
D (比較例)	ニ	131	74	32.4	10	○	54	○	△	△
E (比較例)	ホ	131	74	32.4	8	○	23	×	×	×
F (本発明)	ヘ	131	74	32.4	14	○	71	○	○	○
G (比較例)	ト	131	74	32.4	25	×	86	○	○	○
H (比較例)	チ	131	74	32.4	9	○	55	○	○	△
I (比較例)	リ	131	74	32.4	37	×	56	○	○	△
J (本発明)	ハ	86	67	24.2	14	○	52	○	○	○
K (比較例)	ハ	67	53	19.0	26	×	53	○	○	○

## 【0028】・評価方法

・紫外線透過率 紫外線A波長(400~320nm)の、試料のある時と無い時の分光光度計による光度の比率を百分率にて表示

・吸水性 —— JIS L 1096(パイレックス法)に準ず

・風合い —— 検査員による一対比較法でのハンドリング評価

【0029】表2に於いての各評価は、紫外線透過率評価においては、実用上紫外線問題をおこしにくいとされる紫外線A波長が15%以内の紫外線透過率のものに○印、それ以上のものには×印を、また、吸水評価においては、発汗時に不快感無く吸汗するバレル法にて50mm/m以上のものに○印、それ以外のものには×印を、風合い評価においては、一対比較法にて、良いものに○印、やや悪いものには△、悪いものには×印を、糸道摩耗評価においては、品質や生産に支障の無いものには○、支障をおこす可能性のあるものに△、改善が必要なものには×印で示した。

【0030】表2から明かなように、本発明による加工

揚がり織物No. B、C、FおよびJは、紫外線の防御性能に優れると共に、吸水性や肌触りも良好で、総合的に夏用衣料としての衣料特性に非常に優れたものであった。これに対し、無機顔料の含有量の少ない織物No. Aは、紫外線の防御性能が劣り、無機顔料の含有量の多い織物No. Hは、織物製造までの工程で糸道摩耗がおこり、複合紡績糸の糸構造が芯鞘構造でなく、サイドバイサイド構造である織物No. Dは、風合いと糸道摩耗に難点があり、複合紡績糸の芯の比率の大きい織物No. Eは、吸水性が悪くなり、風合いと糸道摩耗も悪くなり、複合紡績糸の芯の比率の小さい織物No. G、カバーファクターの小さい織物No. K、およびD線屈折率の小さいゼオライトを含有する合成繊維マルチフィラメントを複合糸の芯に用いた織物No. Iは、紫外線の防御性能が劣るものであった。

## 【0031】

【発明の効果】本発明の複合糸織物は、紫外線の防御性能に優れると共に、吸水性や肌触りが良好で、品質良く安定した生産が可能な従来に見られない衣料用途として汎用性の高いものである。

フロントページの続き

(51) Int. Cl.<sup>6</sup>

D02G 3/04  
3/36

識別記号

庁内整理番号

FI

技術表示箇所